

# **Natural Sciences 102 -- Spring 2004**

Homework #4, April 20, 2004

Due in class April 27, 2004

## **1. An essay question:**

Someone (it might have been me) once said “Much that we cherish in our culture, such as philosophy, music, literature, art, basketball, etc., struggle with the question, “What is our place in the universe?” Cosmology attempts to answer a different question, “What is the universe?” I believe attempts to answer the first question have always been influenced by our perception of the answer to the second.

As our view of the universe has evolved, it has influenced art and literature. If you disagree, I would be very interested in your comments. If you agree with the statement, I would like some examples to support the case, with discussion. (Please, one page or less.)

## **2. Degrees, seconds, *et al.*: (Please show your work.)**

- a) Convert 10 degrees to seconds of arc
- b) Convert 0.01 radians to seconds of arc

## **3. Parsecs and parallax: (Please show your work.)**

- a) A star has an annual stellar parallax of 0.1". What is its distance?
- b) A star is 30 pc distant. What is its annual stellar parallax?

**4. Do you have principles:** Do you think the Anthropic Principle (discussed in class 4/22) is a principle? In a paragraph or so, tell me why or why not.

## **5. An essay question (compare and contrast):**

Comment upon these two poems---one from the 19th century and one from the 20th century. Is the great increase in our knowledge of the stars in the 128-year interval between the poems reflected in the poems? “Compare and contrast”

[Keats and Frost were highly educated (mainly self-educated in the case of Frost) with access to the latest knowledge in astronomy. Frost seems to have been quite fond of and well versed in astronomy—a subject touched upon in many of his poems: (Stars; A Star in a Stoneboat; The Star Splitter; Canis Major; On Looking up by Chance at the Constellations; Lost is Heaven; The Literate Farmer and the Planet Venus; Astrometaphysical; The Milky Way is a Cowpath; Some Science Fiction; Why Wait for Science; Take Something Like a Star).]

Bright Star.  
John Keats -- 1819

Bright star! Would I were steadfast as thou art--  
Not in lone splendour hung aloft the night,  
And watching, with eternal lids apart,  
Like Nature's patient sleepless Eremite,  
The moving waters at their priestlike task  
Of pure ablution round earth's human shores,  
Or gazing on the new soft fallen mask  
Of snow upon the mountains and the moors--  
No-yet still steadfast, still unchangeable,  
Pillow'd upon my fair love's ripening breast,  
To feel for ever its soft fall and swell,  
Awake forever in a sweet unrest,  
Still, still to hear her tender-taken breath,  
And so live ever-or else swoon to death.

Choose Something Like a Star.  
Robert Frost -- 1947

O Star (the fairest one in sight),  
We grant your loftiness the right  
To some obscurity of cloud --  
It will no do to say of night,  
Since dark is what brings out your light.  
Some mystery becomes the proud.  
But to be wholly taciturn  
In your reserve is not allowed.  
Say something to us we can learn  
By heart and when alone repeat.  
Say something! And it says ``I burn."  
But say with what degree of heat.  
Talk Fahrenheit, talk Centigrade.  
Use language we can comprehend.  
Tell us what elements you blend.  
It gives us strangely little aid,  
But does tell something in the end.  
And steadfast as Keats' Eremite,  
Not even stooping from its sphere,  
It asks little of us here.  
It asks of us a certain height,  
So when at times the mob is swayed  
To carry praise of blame too far,  
We may choose something like a star  
To stay our minds on and be staid.

### News of the week

- The class website is: <http://home.fnal.gov/~rocky/natsci102/>.
- This week's laboratory will be the first week of "Temperature of the Universe."
- May's reading assignment is Kolb, Chapters 6-11; Hogan, the entire book.